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ELFA

PRODUKTINFORMATION

Vi reserverar oss mot fel samt förbehåller oss rätten till ändringar utan föregående meddelande

ELFA artikelnr

73-087-45 SMTHS10 fuktsensor

The SMARTEC humidity sensors

Most Important Features and Typical Applications

Most Important Features

- Linear 0 - 100 % RH
- High Performance
- Long Term Stability
- Close tolerances
- Reliable construction and
- Low cost

Typical Applications

- Airconditioners
- Climate control for green houses
- Storage and warehouses
- Meteorological applications
- Food processing
- Room comfort control
- Medical applications

The SMARTEC humidity sensors

FUNCTIONAL DESCRIPTION

The measuring of humidity is difficult. Generally the humidity in air is measured as the fraction of the maximum amount of water that can be absorbed at a certain temperature. In air, at a given temperature, this fraction can vary between 0 (absolute dry) and 100 (the point where condensation will begin to form). Many classical sensing techniques, such as mechanical devices and resistive type sensors, are temperature dependent and the wet bulb thermometer is pressure dependent. With the SMARTEC Humidity sensor RH can be measured without the complicating factor of temperature and pressure.

Application circuit for Humidity sensor SMTHS10 DC output

The below given circuit is a typical astable multivibrator application based on the very popular TLC 555 (CMOS type). The SMTHS10 is used as variable capacitor. Of course other measurement circuits can be used.

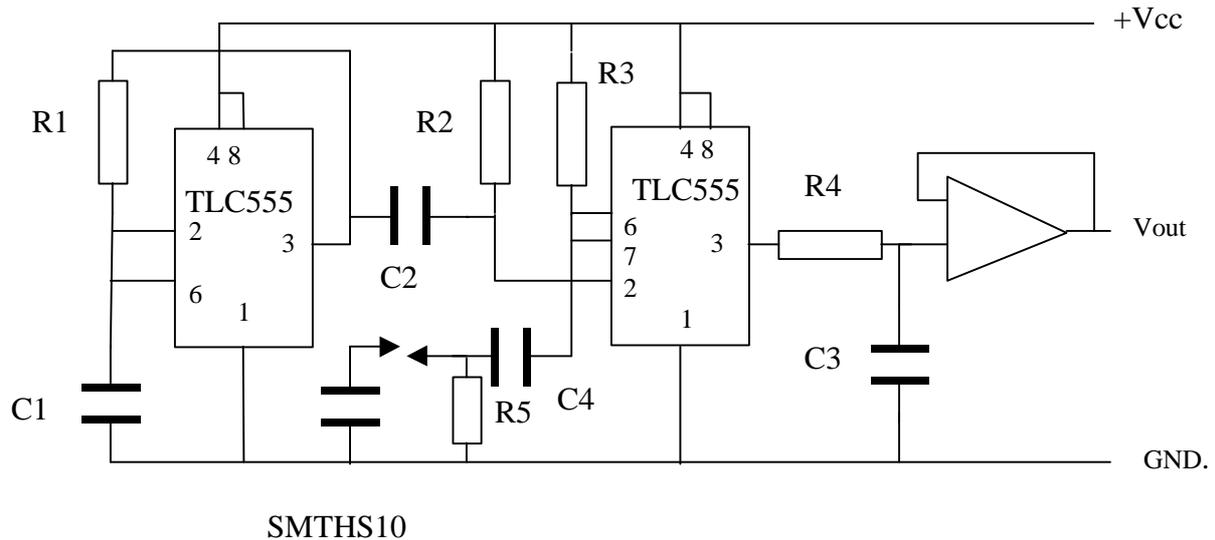


Fig 1. Typical measurement design based on 2xTLC555 with DC output.

Components list:

R1	=	27 K Ω	C1	=	0.1 μ F
R2	=	1 K Ω	C2	=	1 nF
R3	=	150 K Ω	C3	=	1 μ F
R4	=	100 K Ω	C4	=	0.1 μ F
R5	=	10 M Ω			

R3 and C1 are used to prevent a DC voltage over the humidity sensor.

Vout varies between around 0.5 Vcc and Gnd. and is influenced by R1 and C1

Circuitry runs around 25 Kc (left 555). The monostable based on the HS10 and load resistance of 150 K Ω has a pulse output time of about 25 μ s. Other values are of course also possible. The output of the monostable is low passed filtered by R4 and C3 (time constant 100 ms). And buffered by a simple opamp.

Calibration of humidity sensors.

The calibration of humidity sensors is not so easy. One can perform a lot of measurements in the climate chamber but there is a much cheaper and low cost way to check humidity sensors by means of salt solutions. Special saturated salt solutions have always the same humidity in the area above. This humidity depends only on temperature. Find below and overview of salt-solutions that can be used.

Salt (saturated in water)		RH (%)	
		@ 25 °C	@ 20 °C
Lithium Chloride	LiCl	11.3 (± 0.3)	12
Magnesium Chloride	MgCl	32.8 (± 0.3)	33.1 (± 0.2)
Magn. Nitrate	Mg(NO ₃)	53.0 (± 0.1)	55
Sodium Chloride	NaCl	75.3 (± 0.1)	75.5 (± 0.1)
Potassium Chloride	K ₂ SO ₄	97.3 (± 0.5)	97.6 (± 0.5)

(Handbook of Chemistry and Physics)

Table 1, Humidity of saturated salt solutions

The salt solution must be put into a glass container with a sealable top. With a couple of cm. Salt solution on bottom the humidity above is constant and only depends on temperature. Place the sensor into the air above the solution and close the access hole carefully. Leave the sensor stabilizing for about half an hour and read afterwards the sensors value. Be aware that the temperature of the container needs to be constant over the period. Therefore it is recommended to use a well-isolated glass container.

In case a two point calibration is performed in general LiCl and NaCl solutions are used.

In a three point calibration LiCl, Mg(NO₃) and K₂SO₄ solutions are recommended.

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